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Prevalence of Malnutrition in Under-Five Children of Mittapalem Village in Rayalaseema Region

Ashok Kumar Reddy Kapu¹, Venkata Prasad Upadrasta^{2*}, Satyendra Nath Ponna³, Bharathi S⁴, Hemalatha Bathina⁵, Renuka Sadasivuni⁶, J.J. Babu Geddam⁷, Sri Lasya Karjala⁸, Shankar Reddy Dudala⁹

Affiliation: 1 Professor & Head, 9 Associate Professor, Department of Community Medicine, & 8 Final year MBBS, Sri Venkateswara Medical College, Tirupati, Chittoor district, Andhra Pradesh. 2 Scientist 'C', 3 Scientist 'D', 4 Scientist 'C', 5 Project Technician III & 6 Statistician, Model Rural Health Research Unit, Department of Health Research, Chandragiri, Chittoor district, Andhra Pradesh. 7 Scientist 'F' & Deputy Director, Head, Clinical Epidemiology Division, National Institute of Nutrition, Hyderabad.

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***Author for correspondence:** Dr. Venkata Prasad Upadrasta, Scientist 'C', Model Rural Health Research Unit, Department of Health Research, Chandragiri, Chittoor district, Andhra Pradesh, India. E mail: prasadv@gmail.com

ABSTRACT

Background: Nutritional status of children is one of the major components of economic development of the country. Annually, about 1.83 million children die before completing their fifth birthday. Majority of such deaths can be prevented by effective screening and timely intervention as deaths are more due to malnutrition. Even-though there is decrease in prevalence of underweight and stunted children from NFHS-3 to NFHS-4, such children were reported more in rural India than urban. So, this study was intended to assess the nutritional status of under-five children in Mittapalem village. **Methods:** A community based cross sectional study was conducted from July to September, 2016 in Mittapalem village located about 3 km from Chandragiri Mandal of Chittoor district, Andhra Pradesh. Forty one under-five children were identified and recruited. Nutritional status was assessed by collecting anthropometric measurements of weight, height and Mid Upper Arm Circumference. **Results:** Prevalence of stunting was observed in 31% of boys and 24 % of girls, while wasting was observed in 6.3% of boys and 16% of girls. 6.3% of boys had chronic energy deficiency while girls had 12%. Boys and girls had undernourishment of 6.3% and 12%, respectively. **Conclusion:** Prevalence of chronic malnutrition is 5 times higher among boys and 1.5 times among girls than acute malnutrition in under-five children. It can be corrected by improving health and nutritional status of women and children by provision of access to community health services, production of nutritious staple crops and curtailing poverty by providing sustainable livelihood for women.

Key-words: Under-five children, malnutrition, community health services.

INTRODUCTION

Ensuring adequate nutrition is a key factor and determinant of health and development for any age, starting from childhood. While there have been several achievements in economic progress in the country, the fruit of development towards a better nutritional status of children is yet to unfold. Children are the country's largest investment as they are the future of the Nation. Nutritional status of children is one of the major components of economic development of any country. According to United Nations Children's Fund (UNICEF) malnutrition in its various forms, including under-nutrition has been coined as 'silent emergency' as it is associated with an impact on maternal and child health across the world.^{1,2} Around the world, including India, morbidities associated with micronutrient deficiencies and under-nutrition remain a major public health problem.³ As per World Health Organization (WHO), children with malnourishment have lower resistance to infections and die from common childhood ailments such as respiratory infections and diarrheal diseases. Those who survive are locked into a vicious cycle of recurring sickness, diminished learning ability, faltering growth and frequent illness saps their nutritional status.⁴

Annually, about 1.83 million children die before completing their fifth birthday and most of them are due

to preventable causes.⁵ As per global data, in 2012, about 99 million (15%) under five children were under-weight, 162 million (25%) were stunted, and 51 million (8%) were wasted, where 80% of these stunted children living in just 14 countries.⁶ In 2015, 5.9 million under 5 children died worldwide. About 45% of all child deaths were linked to under nutrition. Hence, evaluation of nutritional status of children is imperative, as it is an important index of national development.^{7,8}

According to 2011 censuses, there are 472 million children of 0–18 years, comprising 39% of the country's population and there is a huge burden of under nutrition among children.⁹ There is a decline in the prevalence of underweight and stunted under-five children from National Family Health Survey-3 (NFHS-3) (48.0% and 42.5%, respectively) to NFHS-4 (38.4% and 35.7%, respectively).¹⁰ However, as per NFHS-4 reports, underweight and stunting in children were higher in rural India than in the urban population. Therefore, the present study was conducted to assess the nutritional status of under-five children in Mittapalem village, Andhra Pradesh, India.

A community based cross sectional population study was conducted from July to September, 2016 in Mittapalem village located about 3 km from Chandragiri Mandal of Chittoor district, Andhra Pradesh, India. Ethical clearance was obtained from the Institutional ethics committee of Sri Venkateswara Medical College, Tirupati, Andhra Pradesh, India. Mittapalem village comprises of 102 households (HHs). Total population was 535 where 257 were males and 278 were females. Line listing survey was conducted and found to have 41 under-five children among total population. All the children were recruited for the study after taking oral and written consent from their parents. No child was found to have critical illness or congenital anomalies to exclude from the study.

Parents were interviewed using a pretested semi-structured interview questionnaire. Socioeconomic and demographic particulars such as community, religion, education, occupation, and income were collected from all the selected HHs using a precoded and pretested questionnaire. The remaining survey instruments consisted of information on birth order, breast-feeding and complementary feeding practices, immunization status and morbidity profile of the child. Nutritional status was assessed by collecting anthropometric measurements. Height/length (up to the nearest 1 mm) of the children was measured using an infantometer/anthropometer rod and weight (up to nearest 100 g) using the SECA (Deutschland, Medical Scales and Measuring system, Hammer Steindamm 9-25, Hamburg, 22089, Germany by implementing standard procedures).¹¹ Mid Upper Arm Circumference (MUAC) was measured using fibre reinforced measuring tape.

Statistical Analysis:

Descriptive analysis was carried out using SPSS version 17.0 (SPSS Inc., Chicago, IL, USA). BG Prasad’s rural scale was used to determine HH socio-economic status (using 2015 base year). Z scores for weight-for-age, height-for-age, weight-for-height, Body Mass Index (BMI)-for-age and MUAC-for-age were calculated using WHO Anthro v3.2.2 software. Underweight, stunting, wasting, chronic energy deficiency (CED), undernourishment, overweight and obesity in proportions were calculated based on WHO-UNICEF growth standards nutrition estimates, 2006 (<median -2 SD and <median -3 SD).¹² The children with <median -2SD of “weight-for-age”, “height-for-age” and “weight-for-height” indices were classified as underweight, stunting and wasting, respectively. Children with <median -3SD of the same parameters were classified as “severe underweight”, “severe stunting” and “severe wasting”, respectively.

RESULTS

The under-five population of Mittapalem village of Chandragiri mandal, Chittoor district during July and September, 2016 comprised 16 boys and 25 girls. Majority (42.5%) of children were in the age group of 12-

35 months. Most of the children belonged to the middle socio economic class and were from joint families. Table 1 depicts the prevalence of malnutrition in the studied children. Prevalence of stunting was observed to be 31.3% in boys and 24% in girls, while 31.3% of boys and 32% girls were underweight and wasting was observed in 6.3% of boys and 16% of girls. Chronic energy deficiency (CED) was seen in 6.3% of boys and in 12% of the girls. Undernourishment was seen in Boys 6.3% and 12% of boys and girls, respectively.

Table 1: Prevalence of malnutrition in under-five children

Nutritional Status	Boys (n = 16)	Girls (n = 25)
Stunting		
Severe(≤ -3SD)	25	4
Moderate(≤ -2SD to -3SD)	6.25	20
Normal(> -2SD to < 2SD)	62.5	68
Over-height(≥ 2SD to 3SD)	-	4
Giant(≥3 SD)	6.25	4
Underweight		
Severe(≤ -3SD)	18.75	-
Moderate(≤ -2SD to -3SD)	12.5	32
Normal(> -2SD to < 2SD)	56.25	64
Overweight(≥ 2SD to 3SD)		4
Obese(≥3 SD)	12.5	
Wasting		
Severe(≤ -3SD)	-	4
Moderate(≤ -2SD to -3SD)	6.25	12
Normal(> -2SD to < 2SD)	81.25	84
Overweight(≥ 2SD to 3SD)	6.25	-
Obese(≥3 SD)	6.25	-
Chronic Energy Deficiency		
Severe(≤ -3SD)	-	4
Moderate(≤ -2SD to -3SD)	6.25	8
Normal(> -2SD to < 2SD)	81.25	88
Overweight(≥ 2SD to 3SD)	6.25	-
Obese(≥3 SD)	6.3	-
Undernourishment(MUAC)		
Moderate(≤ -2SD to -3SD)	6.25	12
Normal(> -2SD to < 2SD)	93.75	88

Values are percentages.

Table 2 reveals the distribution of nutritional status of the studied children, with respect to mother’s age at marriage. Both, severe wasting and severe chronic energy deficiency were observed in children, whose mothers married before 18 years of age.

Table 3 depicts the nutritional status of under-five children stratified by birth-order and interval between indexing child and previous live birth. Underweight, wasting, CED and undernourishment were more in children other than the 1st child. Further, underweight, stunting, wasting, CED and undernourishment were seen more in children who had ≤2 year interval between two births.

Table 2: Distribution of Nutritional status of under-five children with respect to their mother's age at marriage

Nutritional status	Mother's age at marriage	
	≤18 years (n=20)	> 18 years (n=21)
Underweight		
Severe(≤ -3SD)	-3.36±0.16 (2)	-3.75 (1)
Moderate(≤-2SD to -3SD)	-2.11±0.26 (6)	-2.36±0.18 (4)
Normal(> -2SD to < 2SD)	-1.20±0.67 (12)	-0.35±1.07 (13)
Overweight & Obese (≥ 2SD)	-	3.95±0.59 (3)
Stunting		
Severe(≤ -3SD)	-3.62±0.16 (2)	-3.59±1.36 (3)
Moderate(≤-2SD to -3SD)	-2.47±0.35 (4)	-2.30±0.52 (2)
Normal(> -2SD to < 2SD)	-0.77±0.63 (14)	-0.11±0.88 (13)
Wasting		
Severe(≤ -3SD)	-3.21 (1)	-
Moderate(≤-2SD to -3SD)	-2.75±0.49 (3)	-2.50 (1)
Normal(> -2SD to < 2SD)	-1.19±0.93 (16)	-0.69±0.91 (18)
Overweight & Obese (≥ 2SD)	-	4.16±1.9 (2)
Chronic Energy Deficiency		
Severe(≤ -3SD)	-3.26 (1)	-
Moderate(≤-2SD to -3SD)	-2.74±0.13 (2)	-2.58 (1)
Normal(> -2SD to < 2SD)	-1.09±0.96 (17)	-0.52±0.99 (18)
Overweight & Obese (≥ 2SD)	-	4.1±2.09 (2)
Undernourishment(MUAC)		
Moderate(≤-2SD to -3SD)	-2.16 (1)	-2.20±0.01 (3)
Normal(> -2SD to < 2SD)	-1.08±0.5 (19)	-0.60±1.19 (18)

Values are median±SD of Z-scores. Counts in parenthesis.

Table 4: Distribution of age groups with respect to morbidities

	Age group (in months)			Total (n=37)
	0 - 11 (n=11)	Dec-35 (n=15)	≥ 36 (n=11)	
Diarrhea	2 (18.2)	4 (26.7)	1 (9.1)	7 (18.9)
Acute Respiratory Tract Infections (ARI)	1 (9.1)	3 (20.0)	1 (9.1)	5 (13.5)
Fever & Diarrhea	-	-	2 (18.2)	2 (5.4)
Fever & ARI	-	-	1 (9.1)	1 (2.7)
Diarrhea & ARI	1 (9.1)	1 (6.7)	1 (9.1)	3 (8.1)
Fever, Diarrhea & ARI	2 (18.2)	-	-	2 (5.4)

Values are proportions. Proportion of subjects in parenthesis.

Table 4 shows the morbidities reported in under-five children. The number of children reported with diarrhea and ARI was higher in the 12-35 months age group

compared to the remaining two groups. Diarrhea and ARI were the most common morbidities reported in children aged under five.

DISCUSSION

The study reports the prevalence of underweight and stunting in under-five children of Mittapalem village to be 31.3% and 27.6%, which is below the national average of rural India (38.3% and 41.2%) as well as state average of rural populace of Andhra Pradesh (33.1% and 32.5%).^{10,13} Furthermore, the prevalence of nutritional status indicators of Mittapalem village (underweight-31.3%, stunting-27.6% and wasting-11%) was lower than Chittoor district (33.6%, 31.7% and 16.3%) respectively as well.¹⁴

In this study, 27.6% of under-five children were stunted in which more number of boys shows stunting (31.3%) than girls (24%). Prevalence of wasting and chronic energy deficiency was 12.2% and 12% in girls compared to 6.3% and 6% in boys. A study by Priyanka et al., in Kerala¹⁵, reported that the prevalence of underweight and stunting among the study subjects was found to be 28.3% and 14%, respectively and 49 (13.6%) children in the study group were both under-weight and stunted. Before the bifurcation of Andhra Pradesh, a rapid survey on children¹⁶ was conducted by UNICEF in 2013-14, which reported that 35.4% of under-five children in whole Andhra Pradesh were stunted and this was higher compared to Mittapalem (27.6%) as reported in this study. Compared to both the studies, the present study reports higher prevalence of underweight and stunting. However, the proportion of underweight is equal in both boys and girls; and the prevalence of wasting is more in girls and stunting was higher in boys, which differs from the study by Priyanka et al.¹⁵

The prevalence of stunting and wasting among girls at Mittapalem village is 24% and 16% compared to third round of National Nutrition Monitoring Bureau (NNMB) rural survey in 2012 of 31.2% and 13.8%, respectively.¹⁷ In this study 6.3% of boys are undernourished compared to NNMB survey of 10.7%. Prevalence of undernutrition, stunting and wasting was 36.6%, 44.7% and 15% was higher in the state of Andhra Pradesh compared to Mittapalem village.

Chronic malnutrition in the under-five children of Mittapalem village is 31% among boys and 24% among girls compared to acute malnutrition of 6.3% and 16.4%. Our study findings corroborate with the findings from NFHS 3 & 4. Government of India with the coordination of state government proposed and established Nutrition Rehabilitation Centers (NRC) to tackle Severe Acute Malnutrition (SAM).¹⁸ However, Severe Chronic Malnutrition is a major burden among communities due to poverty, poor housing, water and sanitation, unemployment and literacy.¹⁹ Therefore multi-sectoral approaches should be adopted to promote the adaptation of local healthy diets, improving feeding practices and enabling sustainable livelihood for the mothers.²⁰

Table 3: Distribution of nutritional status of under-five children with respect to Birth Order and Interval between indexing child and previous live birth

Nutritional status	Birth Order (n = 41)		Interval between indexing child and previous live birth (n = 41)		
	1st Child	Other than 1st child	1st Child	≤ 2 Years	> 2 Years
n	22	19	22	10	9
Underweight					
Severe(≤ -3SD)	–	-3.47±0.26 (3)	–	-3.75 (1)	3.36±0.16 (2)
Moderate(≤-2SD to -3SD)	-2.13±0.21 (5)	-2.39±0.24 (5)	-2.13±0.21 (5)	-2.30±0.27 (4)	-2.39 (1)
Normal(> -2SD to < 2SD)	-1.14±0.92 (16)	-1.10±1.03 (9)	-1.14±0.92 (16)	-1.13±0.84 (3)	1.25±1.19 (6)
Overweight & Obese (≥ 2SD)	3.95 (1)	3.45±0.72 (2)	3.95 (1)	3.45±0.72 (2)	–
Stunting					
Severe(≤ -3SD)	-3.51±0.08 (3)	-4.80±1.51 (2)	-3.51±0.08 (3)	-5.86 (1)	-3.73 (1)
Moderate(≤-2SD to -3SD)	-2.50±0.67 (2)	-2.47±0.27 (4)	-2.50±0.67 (2)	-2.71±0.21 (2)	2.31±0.10 (2)
Normal(> -2SD to < 2SD)	-0.79±0.88 (15)	-0.33±0.77 (12)	-0.79±0.88 (15)	-0.33±0.63 (6)	0.32±0.95 (6)
Wasting					
Severe(≤ -3SD)	–	-3.21 (1)	–	-3.21 (1)	–
Moderate(≤-2SD to -3SD)	-2.38±0.53 (2)	-2.72±0.30 (2)	-2.38±0.53 (2)	-2.50 (1)	-2.93 (1)
Normal(> -2SD to < 2SD)	-0.74±1.00 (19)	-1.17±0.3 (15)	-0.74±1.00 (19)	-0.48±0.47 (7)	1.40±1.08 (8)
Overweight & Obese (≥ 2SD)	2.82 (1)	5.50 (1)	2.82 (1)	5.50 (1)	–
Chronic Energy Deficiency					
Severe(≤ -3SD)	–	-3.26 (1)	–	-3.26 (1)	–
Moderate(≤-2SD to -3SD)	-2.83 (1)	-2.62±0.05 (2)	-2.83 (1)	-2.58 (1)	-2.65 (1)
Normal(> -2SD to < 2SD)	-0.64±1.08 (20)	-1.09±0.83 (15)	-0.64±1.08 (20)	-0.57±0.68 (7)	1.28±0.98 (8)
Overweight & Obese (≥ 2SD)	2.62 (1)	5.58 (1)	2.62 (1)	5.58 (1)	–
Undernourishment(MUAC)					
Moderate(≤-2SD to -3SD)	–	-2.19±0.02 (4)	–	-2.20±0.01 (3)	-2.16 (1)
Normal(> -2SD to < 2SD)	-0.98±0.83 (22)	-0.80±1.12 (15)	-0.98±0.83 (22)	-0.83±0.96 (7)	0.73±1.31 (8)

Values are median±SD of Z-scores. Counts in parenthesis.

Limitations:

Demographics and system level variables were not collected. Further, nutritive intake of children were not estimated, however, the findings highlight the anthropometric status of under-five children at Mittapalem village of Chittoor district of Andhra Pradesh.

Conclusion:

The study results reveal that under-five children had higher prevalence of chronic malnutrition than acute malnutrition and the prevalence is higher in girls than boys. Interventions at community level should be initiated to decrease the prevalence of chronic malnutrition by encouraging behavioral changes towards seeking of health care services, awareness among reproductive and

maternal women about healthy nutrition, ease of access to Integrated Child Development Services (ICDS) and Water, Sanitation and Hygiene (WASH) services and intake of nutritious diet of women and children and linking it with agricultural practices and sustainable livelihood for addressing poverty. Therefore, production and distribution of more nutritious staple crops are to be facilitated and its consumption has to be improved. Perspective, knowledge and skills among the health workers and Accredited Social Health Activists (ASHA) about the issues of health and nutrition has to be improved for provision of health education and improving quality of their services in the community.

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